

# **MALARIA CONTROL IN WAR AREAS**

## **MONTHLY REPORT**

**OCTOBER, 1942**



**FEDERAL SECURITY AGENCY  
U. S. PUBLIC HEALTH SERVICE  
ATLANTA, GEORGIA**



MINOR DRAINAGE FOR MALARIA  
MOSQUITO CONTROL

AREA: SAN ANTONIO, TEXAS

STA: K.D.N.-I

ZONE: KELLY-DUNCAN-NORMYLE



BEFORE

This small pond on Leon Creek was an excellent breeding place for Anopheles quadrimaculatus.



AFTER

A small ditch, easily constructed by hand, eliminated the pond and the need for constant oiling.



## SYLLABUS

A decrease in larvicidal work characterized October's MCWA operations. By the end of the month routine larviciding had been discontinued in all but 56 of the operating areas. The total number of employees on the program decreased by about 150. The amount of larvicidal oil used during October was 100,000 gallons less than in September and paris green consumption decreased by about 30,000 pounds. Minor drainage work is being continued in most places, with a smaller labor force than was used during the summer.

Thirteen major drainage projects costing about \$100,000 were approved by the headquarters office. Forty-three additional major drainage project proposals which will cost over \$800,000 were submitted during October.

Additional trucks and other equipment was obtained from the U. S. Army and the W. P. A. Unless next year's larvicidal program is expanded beyond present indications, equipment shortages should not interfere seriously with the program.

Twenty-one of the Engineering Aides graduated from a special short training course in malaria control given at Texas A. & M. College have been employed on the MCWA program. The loss of trained men to the armed forces continued to handicap the program.

Most of the thick films for the fall blood survey were collected during October. Examination of some 4,500 slides from Arkansas, Illinois and Missouri showed five positives.

Aedes aegypti control operations were curtailed considerably during the latter part of October in the more northerly cities. Personnel on these projects are to concentrate on the location and elimination of "hold-over" breeding places during the ensuing months.

Dog fly control operations reached a peak early in October and then declined. Spraying was discontinued on November 5. The project has been successful in controlling dog fly incidence to below the nuisance level. Military activities along the western Florida Gulf Coast were thus enabled to proceed in a normal manner.

The personnel of the MCWA program have pledged slightly more than 10 percent of the total payroll for the purchase of War Bonds.

About \$470,000 of Public Health Service funds were encumbered during October of which about 80 percent was for personal services.



TABLE I  
MALARIA CONTROL IN WAR AREAS  
USPHS LARVICIDE AND MINOR DRAINAGE PROJECTS  
October 1 - 31, 1942

STATE	Areas in Operation	War Establishments Protected	LARVICIDAL WORK				OTHER WORK				Total Man Hours
			Larvicide Used		Surfaces Treated		Ditching & Cleaning Lin.Ft.	Clearing			
			Oil Gals.	Paris Green Lbs.	Ditches Lin.Ft.	Ponds Sq.Ft.		Ditches Lin.Ft.	Ponds Sq.Ft.		
Alabama	5	25	611	---	12,620	3,477,000	19,162	23,000	268,650	8,483	
Arkansas	12	36	8,398	975	2,682,459	55,387,633	45,112	59,592	3,621,425	26,251	
California	2	4	2,755	---	102,400	4,360,785	6,211	41,410	132,950	2,564	
D. C.	1	17	430	---	73,717	238,300	18,372	3,700	---	3,932	
Florida	10	58	5,997	10,055	274,724	52,138,399	998,842	181,357	1,040,010	32,652	
Georgia	12	57	143	22,873	1,698,304	104,675,732	159,702	21,145	3,220,096	27,027	
Illinois	3	10	1,826	977	316,450	5,113,713	45	4,865	670,134	3,438	
Indiana	1	4	376	33	---	636,330	---	145,628	40,394	2,140	
Kentucky	4	16	2,978	---	174,350	10,364,265	5,347	15,090	571,316	7,386	
Louisiana	8	42	122,826	118	14,686,066	300,320,445	26,696	322,070	627,135	78,287	
Maryland	2	7	---	---	---	---	18,447	58,418	51,880	1,672	
Mississippi	6	9	4,465	---	1,238,450	287,600	97,561	64,640	2,609,154	15,990	
Missouri	5	14	2,155	121	94,800	13,411,682	5,735	1,700	565,720	7,522	
North Carolina	8	48	17,554	---	3,615,109	21,831,789	290,554	112,695	2,942,983	29,428	
Oklahoma	4	10	2,419	127	38,028	13,634,856	11,925	11,520	1,139,641	8,500	
Puerto Rico	6	17	1,270	6,546	2,648,584	142,399,541	171,105	80,586	156,532	53,574	
South Carolina	18	43	20,806	192	1,511,158	42,360,404	540,428	489,589	17,233,565	79,717	
Tennessee	9	40	6,476	---	1,250,952	4,555,084	29,778	9,230	388,880	11,024	
Texas	14	153	39,741	150	4,422,397	55,332,736	187,543	349,386	6,457,992	64,809	
Virginia	4	21	7,004	---	687,197	8,113,050	80,805	1,943,730	49,560	24,092	
Total	134	631	248,260	42,167	35,557,795	836,639,344	2,713,770	3,939,351	41,788,017	488,488	

July 1 -- October 31, 1942										
Alabama	--	--	11,455	---	141,970	18,824,750	96,005	70,777	1,065,200	35,473
Arkansas	--	--	30,181	5,146	10,699,265	235,676,592	432,187	251,265	11,254,923	101,517
California	--	--	4,279	---	102,400	6,141,525	6,286	42,870	209,870	3,698
D. C.	--	--	1,750	---	159,611	522,366	27,810	28,795	19,391	11,257
Florida	--	--	42,647	29,116	3,185,711	321,354,128	1,693,522	373,336	2,874,176	123,493
Georgia	--	--	243	65,865	2,627,840	318,319,959	270,117	501,301	12,248,944	78,243
Illinois	--	--	7,339	1,281	1,449,125	17,483,716	1,245	11,665	2,722,104	12,949
Indiana	--	--	3,088	2,294	59,000	4,212,825	890	170,978	739,144	9,499
Kentucky	--	--	23,699	---	1,758,275	83,781,011	10,734	146,140	2,684,646	36,440
Louisiana	--	--	476,504	5,865	58,621,742	1,066,320,956	83,006	479,753	1,182,707	260,206
Maryland	--	--	---	---	---	---	18,447	58,418	51,880	1,672
Mississippi	--	--	44,969	7	7,859,115	10,492,999	381,664	862,490	10,114,437	68,534
Missouri	--	--	8,451	458	198,765	45,225,369	6,150	95,140	1,515,892	21,657
North Carolina	--	--	88,338	---	19,305,720	87,246,069	1,065,947	2,555,173	10,026,480	124,675
Oklahoma	--	--	15,067	164	743,217	37,883,834	72,610	232,333	2,121,406	30,747
Puerto Rico	--	--	2,771	20,669	8,991,262	526,275,897	543,613	300,600	1,738,332	177,695
South Carolina	--	--	175,513	2,266	19,045,084	399,047,217	2,074,771	2,537,631	78,675,428	349,843
Tennessee	--	--	48,454	53	6,644,256	59,010,785	137,262	106,775	1,045,332	52,304
Texas	--	--	160,217	2,150	21,063,563	254,890,866	1,121,875	880,134	32,444,161	220,462
Virginia	--	--	49,442	62,645	4,994,615	61,925,395	230,463	6,203,190	2,807,520	87,713
Total	--	--	1,194,467	197,979	167,656,056	3,554,596,259	8,275,204	15,888,711	175,512,193	1,848,007

TABLE II  
MALARIA CONTROL IN WAR AREAS  
NUMBER OF PERSONNEL ON DUTY ON OCTOBER 31, 1942 AND TOTAL PAYROLL FOR MONTHS OF OCTOBER

STATE	TYPE OF PERSONNEL										Total		Percent of Total	
	Commissioned		Prof. & Sci.		Sub-Prof(1)		C. A. F.		Custodial					
	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay
Alabama	--	---	8	1,783	2	285	1	120	107	10,807	118	12,995	3.3	3.4
Arkansas	--	---	8	1,466	13	1,900	4	562	165	15,666	190	19,594	5.3	5.2
California	--	---	2	333	5	892	2	337	9	1,680	18	3,242	0.5	0.9
D. C.	1	285	1	275	2	515	1	120	18	1,637	24	2,832	0.7	0.8
Florida	--	---	9	2,054	17	2,565	4	577	174	17,750	204	22,946	5.7	6.1
Georgia	--	---	7	1,100	33	4,609	4	577	85	8,413	129	14,699	3.6	3.9
Illinois	--	---	2	491	9	1,029	3	457	20	1,920	34	3,897	0.9	1.0
Indiana	--	---	4	650	2	190	1	120	7	1,067	14	2,027	0.4	0.5
Kentucky	--	---	5	866	8	1,267	3	457	50	5,170	66	7,760	1.8	2.1
Louisiana	2	677	9	1,650	28	4,054	5	620	417	40,643	461	47,644	12.8	12.6
Maryland	--	---	1	267	5	722	2	337	22	2,171	30	3,497	0.8	0.9
Mississippi	--	---	6	1,250	15	2,318	1	120	75	7,837	97	11,525	2.7	3.1
Missouri	1	333	6	1,117	5	739	3	457	34	3,340	49	5,986	1.4	1.6
North Carolina	--	---	8	1,775	11	1,854	4	465	300	29,285	323	33,279	9.0	8.9
Oklahoma	--	---	4	642	5	552	1	120	41	4,363	51	5,877	1.4	1.6
Puerto Rico	1	*	4	*	10	*	7	*	373	*	395	19,679	11.0	5.2
South Carolina	--	---	9	2,196	24	3,819	3	456	444	43,522	480	49,993	13.4	13.3
Tennessee	--	---	7	1,419	6	1,033	2	337	63	6,043	78	8,832	2.2	2.3
Texas	--	---	14	2,917	61	9,758	4	375	293	30,702	372	43,752	10.4	11.6
Virginia	--	---	4	1,017	9	1,311	2	337	170	14,703	185	17,368	5.2	4.6
<u>Aedes aegypti</u>														
Florida	--	---	1	267	45	6,096	2	240	32	3,314	80	9,917	2.2	2.6
South Carolina	--	---	1	166	13	1,820	1	120	--	--	15	2,106	0.4	0.6
Texas	--	---	5	881	3	551	1	84	8	1,046	17	2,562	0.5	0.7
H. Q. & Dist. (2)	23	8,016	11	1,980	37	5,468	75	8,177	11	858	157	24,499	4.4	6.5
Total	28	9,311	136	26,762	369	53,349	136	15,569	2918	251,937	3587	376,608	100.0	100.0
Percent of Total	0.8	2.6	3.8	7.5	10.3	14.9	3.8	4.4	81.3	70.6	100.0	100.0		

\* Figures not available

(1) Includes Entomological Inspectors

(2) Includes Headquarters and District offices, malaria survey, special investigations and employees temporarily attached to Headquarters pending assignment to States.



Monthly Report  
Malaria Control in War Areas  
October, 1942

During October larvicidal work was discontinued in all but 56 of the areas operating under the MCWA program and in many of these the larvicidal work had been greatly curtailed by the end of the month. Minor drainage operations are to be continued in most of the areas during the winter. The total number of employees decreased by about 150 during the month. Table I (page 2) shows data on the larvicidal program for the month and cumulative figures for the period July 1 - October 31. Table II (page 2) shows data on the number of employees and the payroll for October. Table III lists the areas in which larviciding continued after October 31.

TABLE III

AREAS IN WHICH LARVICIDING CONTINUED AFTER OCTOBER 31

<u>ALABAMA</u>	<u>GEORGIA (Con'd)</u>	<u>MISSISSIPPI (Con'd)</u>	<u>TENNESSEE</u>
Mobile	Albany	Jackson	Shelby County
	Valdosta	Greenville	
<u>CALIFORNIA</u>	Moultrie	Columbus	<u>TEXAS</u>
Tulare	Douglas	Clarksdale	Valley
Merced	Bainbridge		Caddo Lake
		<u>NORTH CAROLINA</u>	Texarkana
<u>FLORIDA</u>	<u>LOUISIANA</u>	New Bern	Corpus Christi
Tallahassee	New Orleans		Gulf Health
Jacksonville	Alexandria	<u>PUERTO RICO</u>	Houston
Marianna	Shreveport	Camp Tortuguero	Port Arthur
Arcadia	Lake Charles	Losey Field	San Antonio
Tampa	Baton Rouge	Fort Buchanan	Killeen
	Monroe	Vieques Island	Fort Worth-Dallas
<u>GEORGIA</u>	Lafayette	Ceiba	Bastrop
Macon	Leesville	Caguas Cantonment	West Texas
Augusta			Wichita Falls
Hinesville	<u>MISSISSIPPI</u>	<u>SOUTH CAROLINA</u>	El Paso
Savannah	Hattiesburg	Aiken	
Brunswick	Meridian		<u>VIRGINIA</u>
			Peninsula

With the mosquito breeding season drawing to a close a backward glance at the first season's work of the MCWA program indicates that on the whole, the purpose of the program, to control the production of malaria mosquitoes in the vicinity of war establishments, has been attained. Entomological data have shown a consistent increase in the number of establishments at which satisfactory control was secured, as indicated by the density of adult Anopheles quadrimaculatus in or near war establishments.

Starting with a small group of trained personnel, and with little equipment, a sizeable organization, including more than 3,700 employees, has been built up, and trained; equipment and supplies have been procured in the face of increasing shortages of man power and material with accompanying priorities and rationing. Much of the credit for this is due to the State Health Departments cooperating in the MCWA program and much to the



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assistance of the Public Health Service District and Liaison offices, the various Federal agencies, notably the Army, Navy, and the Works Progress Administration from which much equipment has been obtained, and the Civil Service Commission which has aided greatly in recruiting personnel.

It was necessary to start operations in many areas during the mosquito breeding season with untrained workers and with no opportunity to prepare the breeding areas for larviciding. The use of some of the labor crews during the winter months on necessary minor drainage work will reduce the amount of larvicidal work necessary next season, make certain that breeding areas are cleared and brushed to permit the efficient application of larvicides, and provide a nucleus of experienced workers trained in the proper methods of applying larvicides.

The lack of an adequate supply of proper equipment also contributed to operating difficulties and taxed the ingenuity of many of the area supervisors. This obstacle is slowly being overcome, largely by use of the surplus equipment of other governmental agencies. Barring expansion of the program beyond present indications, equipment shortages should not interfere seriously with next years larvicidal program.

A report is planned summarizing in some detail the work of the larvicidal season now coming to a close.

Major Drainage - During October, 13 major drainage project proposals totalling \$109,153 were approved by the headquarters office and the states were authorized to start operations. By the end of the month 43 major drainage project proposals with a total cost of \$814,638 had been submitted by eight states and Puerto Rico. In many instances the projects were submitted before the necessary engineering plans had been completed and approval is awaiting receipt and review of the engineering plans. It is anticipated that most of these projects will be approved and in operation before the end of the year.

In addition to the technical features of each project, the proximity of the work to an important war establishment and the economic justification of the project are considered in the review by the headquarters office.

Another large major drainage project using dynamite has been approved to drain a large swamp near Camden, Arkansas. It is expected that a number of similar projects will be undertaken during the winter.

Equipment - Thirteen trucks were obtained during the month from the U. S. Army making a total of 466 motor vehicles now in operation. A number of pieces of construction equipment have been obtained from the surplus equipment of the W. P. A. during the past month.

Personnel - Twenty-one of the Engineering Aides graduated from a special short training course in malaria control given at Texas A. & M. College have been employed on the MCWA program. These men are being stationed in various states where they will replace men entering the armed forces and those lost to the program for other reasons. In recruiting men for this course an effort has been made to obtain men unlikely to be called for military service.



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During October, five engineers on the MCWA program were commissioned in the USPHS reserve corps and a number of other applications are being considered by the Reserve Board. The loss of trained men continues to handicap the program.

Blood Survey - The bulk of the thick films included in the Fall Survey was collected during the month of October. Full reports are not in yet from those states who are examining their own slides. Slides received in the Memphis office were as follows (these slides were stained as they were received):

Alabama	2590	Louisiana	809
Oklahoma	833	Florida	3735
Illinois	476	Mississippi	5683
Missouri	4091	Kentucky	4284
TOTAL 22,501			

Slides examined during October were as follows:

Arkansas	443	2 positive
Illinois	620	
Missouri	3421	3 positive

Final report on the schools in Arkansas was compiled, summary of which is as follows:

War Areas (approx.)	Schools	Unsatisfactory broken or missing	Number examined	Number positive	Percent positive
10	24	31	2023	10	0.48

Aedes aegypti Control - Dengue and yellow fever control projects which were previously reported, continued in full force during the first part of October. During the last portion of the month operations were curtailed considerably at some places as breeding of Aedes aegypti mosquitoes became slower due to cooler weather. At the southernmost points such as Key West, Florida, and Brownsville, Texas, control activities continued unabated.

The Aedes aegypti educational program planned for the Rio Grande Valley in Texas was instituted. Although this program was carried on by a small Public Health Service staff, its effectiveness was noticeable. Several Hidalgo County towns had relatively high breeding indices when the first surveys were made. On revisitation breeding places for these mosquitoes were difficult to find.

In addition to services given by volunteer individuals and organizations, much was accomplished by well chosen contacts, lectures, and pamphlet distribution. Edinburg, Donna, Weslaco, McAllen, Mission, and Mercedes were included among the smaller cities affected by the Aedes aegypti program in the Rio Grande Valley. The Charleston, South Carolina, Aedes aegypti control program was strengthened by additions to the staff, thereby making it possible to shorten the regular inspection cycle and to include some interior inspections.



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As the active Aedes aegypti breeding season tapers in most of the areas involved in the control program, field personnel are noting possible winter "hold-over" breeding places, for attention during ensuing periods. Necessary materials and equipment for correction of these hazards are being procured and distributed.

The effectiveness of phenothiazine as a long-lasting larvicide for use in such containers as fire barrels was being tested in Galveston. In Charleston, where inspections of catch-basins have demonstrated some Aedes aegypti breeding, motorcycle oiling equipment was found to be economical and efficient. Two men on motorcycles were able to cover all catch-basins in Charleston every ten days.

Dog Fly Control - The dog fly incidence during October was somewhat above the average for previous periods (28.4 compared with 20.6 flies per cow) but the density was still well below the nuisance level throughout the month. Early in the month two additional sprayers were placed in operation making a total of 18 sprayers. The week ending October 10 marked the peak of control operations for the year. During that week more than 20 percent of the spray applied during the entire season was applied to 94 miles of grass along 121 miles of shoreline. Following this peak, operations were curtailed until on November 5 regular spraying was discontinued.

During October and the first five days of November 737,450 gallons of spray were applied to 266 miles of grass along 361 miles of shoreline. A report summarizing the results of the seasons work is being prepared.

War Bonds - By the end of October the employees of the MCWA program had pledged slightly more than 100 percent of their quota of War Savings Bonds. Although almost a third of the employees have not yet authorized payroll deductions, the two-thirds who have done so have authorized deductions averaging more than 10 percent of their gross pay.

Maps - A start was made during October toward the preparation of a set of maps of standard scale and form for all projects. Although these will not be finished before the next larvicidal season begins it is expected that these maps will be available for a number of the more important areas. Two sizes of maps are to be prepared. The larger will be on a scale of about 4 inches per mile and the maps will range in size from about 14"x20" to 21"x30". For office and report use a smaller reproduction of these will be made on letter size sheets.

Expenditures - About \$471,100 of Public Health Service Funds were encumbered during October. The approximate amounts were as follows:

.01 Personal Services	\$376,600
.02 Travel	18,700
.03 Transportation of Things	5,000
.04 Communication Services	2,300
.05 Rents and Utility Services	2,300
.07 Other Contractal Services	9,700
.08 Supplies and Materials	48,100
.09 Equipment	8,400
Total	<u>\$471,100</u>



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## MEASURING MALARIA

During the operation of the Malaria Control in War Areas program an annual thick-film survey will be taken for comparison of populations inside the protected areas with those living in unprotected areas, in an effort to evaluate the influence of the program on the transmission of malaria. Such a direct evaluation is extremely difficult as the survey falls far short of giving all the desired information, but it does offer the most reliable comparative procedure now available.

The ideal method of measuring the success of the program would be to compare accurate records of the actual malaria cases among the troops being protected, with populations exactly similar except for the one factor of the protection afforded by the MCWA program. Such an actual comparison is not possible. Rapid shifts in military personnel and the necessity for secrecy of troop movements make it very difficult to obtain accurate information on the rates of transmission among the troops. Populations which are incidentally protected by the control program are used instead, since comparison can be made between these groups and similar groups outside the control areas which are not so protected.

Using malaria cases alone to judge the success of the MCWA program is not practical. Because the program is a preventive one, emphasis is placed on keeping malaria rates low - not confined to lowering high rates where they may exist. In such cases, measurements of the population of the insect vector - Anopheles quadrimaculatus - offers an indirect but more practical method of evaluating success. Because Anopheline densities are not necessarily proportional to the danger of malaria transmission, however, it would be unwise to abandon the direct method of attempting to measure malaria, in spite of the difficulties encountered.

Two things are necessary if malaria incidence is used as a criterion:

1. A method for accurately determining who has malaria.
2. A method for determining which groups of people are to be compared for obtaining significant results.

Determining who has malaria is not easy. There is no rapid, accurate diagnostic test for malaria that can be applied to large populations. The present low malaria incidence rates prevalent throughout the country make it extremely difficult to obtain data which are statistically significant. The more successful the program, the lower the rates will be kept, and the resultant measures will be proportionately difficult of statistical appraisal.

The only sure diagnostic procedure for malaria is the demonstration of parasites in the blood stream. Since relatively few of the reported cases are diagnosed on this basis, and since reporting is not complete, the statistical reports cannot be relied upon to give a true picture of the malaria situation. Mortality reports, while giving a more reliable comparison from year to year and in various areas, still cannot be relied upon to give an accurate measure of malaria morbidity. Even if the reports of deaths were accurate, the ratio of deaths to cases is not a constant.



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An enlarged spleen is presumptive evidence of malaria in a fairly large percentage of cases, particularly among children.

The most satisfactory method for mass surveying is probably the thick film survey (See illustrated description of process). Although the thick film speeds up the process of examining mass population, as compared with the thin film examination, it is still a slow process, since a well trained technician can examine only 1000 slides per month. A single examination will not result in positive slides in all those individuals who harbor malaria parasites. But, this type of examination is the most reliable and the most consistent method available. In some states splenometry by trained investigators is used to advantage, but this method has not been adopted as standard procedure for this survey.

Thick films have been collected principally during the month of October, which is the time of the year when most chronic malaria cases will show positive results. The group selected has been principally grammar school children who live in areas adjacent to or near the war establishments being protected by this program. Slides were collected by the State Health Departments, usually through the County Health Officer. In some instances it was necessary for supplementary personnel to be furnished by MCWA. As many slides as possible are examined by the State Health Department Laboratories; the others are examined by five MCWA technicians in the Memphis Malaria Investigations Laboratory. An effort is made to report positive cases back to the County Health Officer as soon as possible but there is of necessity several months delay in such reporting.

Even more difficult than diagnosing malaria, is the measurement of all other pertinent factors influencing malaria transmission in order to compare groups of people who are identical in all respects except one. Of course, the ideal of eliminating all variables in such a consideration is impossible. However, this should not prevent an attempt to describe and compare as many of these variable factors as possible. A persistent effort is being made to plan surveys of these variable factors in such a way that all the information gathered will be statistically useful. Such factors as the proximity to known anopheline breeding, the effectiveness of the control procedures as measured by anopheline densities, the extent of mosquito proofing of homes, the density of population, the economic status of the people, will be taken into account. Although it is expected that the number of positives will be few, the value of comparison over a period of several years, will compensate for any lack of statistical significance in comparing positive cases this season. The original plan of having a statistical card for each individual was abandoned this year in favor of having cards for relatively small geographic areas. A description of these areas, including those factors involved in malaria transmission, will be coded on punch cards so that they can be correlated with the results of the blood survey.

A consistent effort to use every means possible to relate the operation of a control program to its primary objective will undoubtedly result in a sounder program. The effort to measure malaria is an example of this principle. In addition to the immediate usefulness of this survey for the control program, it is probable that the information gathered will also be a permanent contribution to the long range fight against malaria in this country.



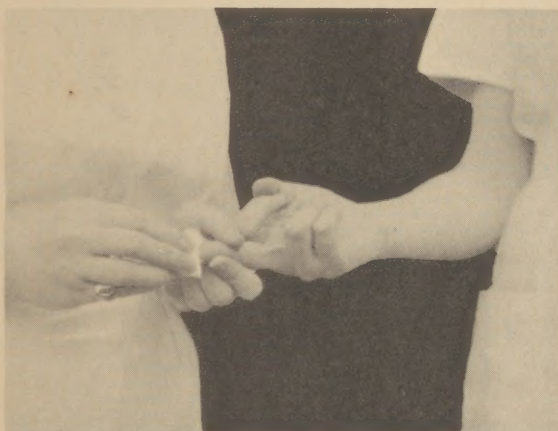
# COLLECTING THICK-FILM BLOOD SMEARS FOR DIAGNOSING MALARIA



Most important single step is thorough cleaning of slides before survey begins. Any grease, even from fingerprints, may cause blood film to drop off when dry. Dirt or dust may interfere with stain; obscure or confuse examination.



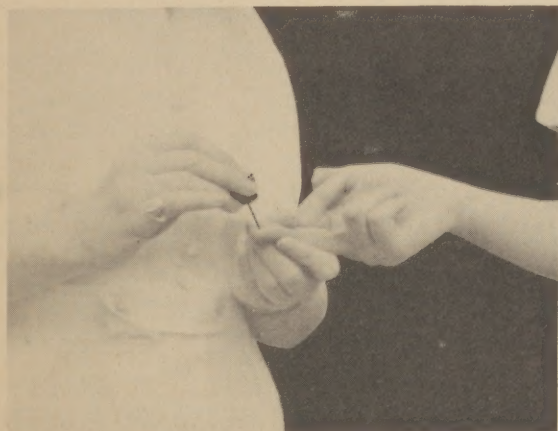
Clean slide, already numbered with wax pencil for reference, is touched to drop of blood without touching finger, evenly rotated to form dime-sized smear near one end of the slide. If necessary, smear may be stirred with corner of next slide.



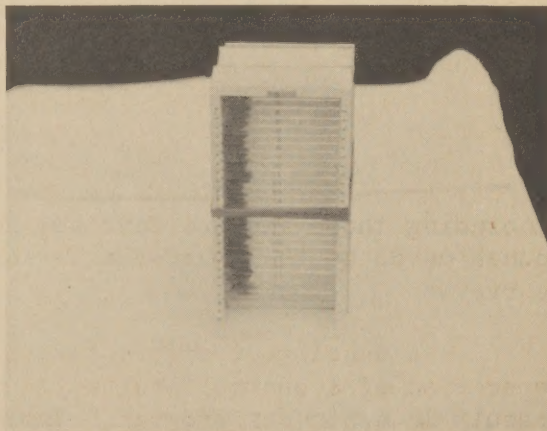
Scrubbing finger (alcohol sponge) removes grease, dirt, and bacteria, which would prevent even smearing of the blood or confuse the microscopic picture. Finger is then thoroughly dried, and held so that the blood can be "milked" to the end.



Newsprint can be read through film of proper thickness. In staining, red cells are hemolyzed, leaving parasites (and nuclei of white cells) concentrated many times as compared with thin smear, permitting examination in 3 to 5 minutes.



A quick jab with a Hagedorn needle (inserted in a cork for better grip, and for sterilizing in alcohol vial between punctures) is made to one side of finger-tip, held turgid with blood by pressure from examiner's thumb and finger.



Finger is wiped dry. Slides must remain flat until dry, to prevent drop running to one edge. Ordinary slide boxes, stood on end, back to back, make a convenient rack. Flies eat blood, must be kept away. Records must be accurate.



YEARLY AVERAGE BY COUNTIES FOR FIVE YEAR PERIOD 1935-1939

